ABSTRACT

A method for the recovery of high purity zinc oxide products, and optionally iron-carbon feedstocks, from industrial waste streams containing zinc oxide and/or iron. The waste streams preliminary can be treated by adding carbon and an ammonium chloride solution, separating any undissolved components from the solution, displacing undesired metal ions from the solution using zinc metal, treating the solution to remove therefrom zinc compounds, and further treating the zinc compounds and the undissolved components, as necessary, resulting in the zinc products and the optional iron-carbon feedbacks. Once the zinc oxide has been recovered, the purification process is used to further purify the zinc oxide to obtain zinc oxide which is at least 99.8% pure and which has predeterminable purity and particle characteristics. Various zinc compounds may then be quickly, easily, and economically produced from this recovered zinc oxide.